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ABSTRACT

This study investigates the hypothesis that it is mixed-dominance among left handers (i.e. left handedness and right eye and/or foot dominance), that is related to academic learning difficulties among such individuals, rather than the generally held notion that their difficulties stem from the fact that they are left handers in a "right handed world." Three experimental groups were defined: (1) left handed, mixed dominance; (2) left handed, unmixed dominance; and (3) right handed. All group members were junior college freshmen females. At the end of their freshman year, the cumulative grade point averages of the three groups were compared. After a brief discussion of the statistical difficulties inherent in the study, it is concluded that the higher incidence of less than 2.5 cumulative averages in the left handed, mixed dominance group represents a "real" difference between it and the other two groups. The possible significance of the findings is discussed. (TL)

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Learning Conflict Among Mixed-Dominance Left-Handed Individuals

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Learning Conflict Among Mixed-Dominance Left-Handed Individuals

Objective

The purpose of this study, a pilot one, was to investigate the hypothesis that it is mixed-dominance among left-handers; i.e., left-dandedness and right eye and/or foot dominance, that is related to academic learning difficulties among such individuals, rather than the generally-held notion that their difficulties stem from the fact that they are left-handers in a 'right-handed-world'.

Background

A review of the literature has not disclosed any attention being directed to this hypothesized aspect of mixed-dominance impact upon academic learning of left-handers. A search completed in October 1970 by the Science Information Exchange of the Smithsonian Institution indicated .... " no relevant notices of Research Projects are registered with us at the present time in the area of learning conflicts in left-handed individuals because of right eye or foot dominance."

Rationale

If one category of learning conflicts are identified with left-handed, mixed-eye-and/or-foot dominance characteristics, early identification of such individuals would permit appropriate patterning of their school instruction and guidance, (i.e., conseling, remediation, psychotherapy - as appropriate) to help avoid and/or alleviate problems of mental health adjustment associated with academic learning difficulties.

Specific Aim

To ascertain if the group difference in academic achievement, as reflected in the cumulative grade-point average for the mixed and unmixed dominance samples, was too great to be reasonably attributed to sampling fluctuations. If it was found to be too great, the null hypothesis would then be rejected with the conclusion that a "real" difference exists between the two populations from which the samples were drawn.

Methods of Procedure

All (36 identified themselves) September 1970 left-handed Harcum Junior College freshmen, (a small, private, independent junior college for women located in Bryn Mawr, Pennsylvania) were interviewed (*) to ascertain if they were "mixed-dominant" in terms of eye and/or foot dominance in relation to their left-handedness. This was ascertained as follows:

(1) To establish 'eye-dominance', an 8½ x 11" sheet of paper was rolled up to form a cylinder. It was handed to the standing student who was requested to "look through the tube". If she asked, "which eye?", she was told, "whichever you wish." The interviewer then noted whether she held the tube up to her right or left eye.

(2) To establish 'foot-dominance', the interviewer next took the sheet of paper, crumpled it, and said to the student standing in front of her -- "I will now throw this paper toward you. I want you to kick it." If the student asks, "with which foot?", the interviewer replied, "whichever you wish."

(3) Standing in front of the student, the interviewer then threw the crumpled paper toward the student, being particularly careful to 'center' the throw; not off to either the right or left side of the student, which might cause the student to try to kick it with the foot nearest to the thrown paper, rather than with her 'naturally-dominant' foot.

At the end of their freshman year, the cumulative grade point averages of three groups were compared, to determine if statistically significant differences existed between the mixed-dominance and the other two groups. (It is assumed, when making such tests of significance between two groups, that scores, or other measures upon which the statistics are based, are "normally" distributed in the population.)

In actuality, what is done - under the null hypothesis - is to estimate ,

(*) Appreciation is expressed to Mrs. Susan Henning, Director of Guidance at Harcum, who conducted these interviews in a thoroughly professional, competant manner.

from the sample statistics available, the probability of a true difference between the two parameters. When the size of the sample is quite small so that the assumption of normality is doubtful - (conventionally, an "N" greater than 30 is called 'large') - "parametric methods" are of dubious value, or are not applicable at all. In such instances, what is needed are techniques which enable one to compare samples and make inferences (or tests of significance), without having to assume normailty in the populations. Such methods are the so-called non-parametric or distribution-free ones. One such technique is the chi-square (X^2) test.

Since the sample groups in this study were less than 30, the chi-square test was utilized. Three samples were the subject of this pilot study - all freshmen students: Group A - the 'experimental', left-handed, mixed-dominance group (N=24); Group B - a 'control', left-handed, unmixed-dominance group (N=12); and Group C - a 'control', right-handed group (N=24). Both groups B and C were 'matched' with Group A in terms of College Board Scholastic Aptitude Test (SAT) Verbal scores, (within 50 points), and, to the maximum extent possible, in the same curriculum.

Results

Comparing the numbers (6 versus 1) of left-handed, mixed-dominance students (Group A) who earned less than a 2.5 cumulative average, (on a scale of A=4, B=3, C=2, D=1) with the unmixed-dominance, left-handed sample (Group B), the critical question raised was -- "is this a statistically significant difference?"

Application of the chi-square formula for testing agreement between 'observed' and 'expected' results yielded a $X^2 = 4.16$ with a probability, or "P" = .03. (In general, one may safely discard a null hypothesis - i.e., the hypothesis of 'equal probability', whenever "P" is .05 or less). Therefore, it was concluded, with a high degree of confidence, ("significant" at the .03 level), that on the grounds the divergence of 'obserbed' from 'expected' results was too unlikely of occurrence to be accounted for solely by sampling fluctuations; the higher incidence of less

than 2.5 cumulative averages among Group A students (mixed-dominance), was considered to be a "real" (not chance) difference between the groups (populations) represented by these samples.

Comparing the number of mixed-dominance, left-handed students (Group A) who earned less than 2.5 cumulative averages with the right-handers (Group C); namely 12 versus 5, the X^2 was found to be 4.08 with a P = .04. Therefore, once again the null hypothesis was rejected - with a high degree of confidence. The observed divergence of higher incidence of less than 2.5 cumulative averages among Group A (mixed-dominance) students was considered to be a "real" difference between the groups (populations) represented by these samples.

Significance

If mixed-dominance among left-handers can, through replication of this study, be reliably associated with academic learning problems or conflicts, (as reflected in lowered academic performance measured through grades), early identification of this fact might well be of material assistance to the individuals involved. By alerting teachers/and guidance personnel, school psychologists to the fact that such individuals are subject to "mixed-dominance learning-conflicts", this could help insure such individuals receiving appropriate supportive, competant assistance to either avoid or alleviate possible mental health maladjustments associated with learning conflict problems.

Postscript

On the basis of the finding reported in this exploratory inquiry, replication of this study, with larger samples and at various levels of schooling, would appear to be warranted.

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